



PATENT  
APPEAL BRIEF

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Frederick Paul Benning et al. : Date: December 22, 2006  
Serial No.: 09/976,167 : Art Unit: 1765  
Filed: October 12, 2001 : Examiner: Shamim Ahmed  
Title: SELF-CLEANING COLLOIDAL SLURRY  
COMPOSITION AND PROCESS FOR FINISHING  
A SURFACE OF A SUBSTRATE

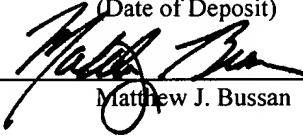
Commissioner for Patents  
P. O. Box 1450  
Alexandria VA 22313-1450

Dear Sir:

I hereby certify that this correspondence is  
being deposited with the United States Postal  
Service as first class mail in an envelope  
addressed to: Commissioner for Patents, P.O.  
Box 1450, Alexandria VA 22313-1450, on

December 22, 2006

(Date of Deposit)

  
Matthew J. Bussan

APPEAL BRIEF IN SUPPORT OF APPEAL  
FROM THE PRIMARY EXAMINER TO THE BOARD OF PATENT APPEALS

Applicant herewith submits an appeal brief in support of the appeal to the Board  
of Patent Appeals and Interferences from the decision dated October 17, 2006 of the  
primary examiner finally rejecting claims 41-50.

An appeal brief fee of \$500 was previously charged to Deposit Account No. 09-  
0465 in conjunction with the Appeal Brief filed on December 30, 2005 and the Amended  
Appeal Brief filed on April 3, 2006 and is to be applied to the instant Appeal Brief. In  
accordance with MPEP §1207.04, the fee paid for the notice of appeal, appeal brief, etc.

Docket No.: ROC920010111US1  
Serial No.: 09/976,167

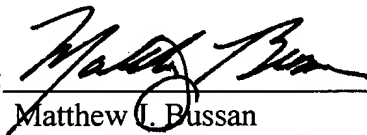
PATENT  
APPEAL BRIEF

will be applied to a later appeal on the same application if, as in the present case, prosecution was reopened prior to a decision on the merits by the Board of Appeals and Interferences and the appellant elected to continue prosecution.

The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 09-0465. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

By: \_\_\_\_\_



Matthew T. Bussan  
Registration No.: 33,614  
1048 Dove Way  
Cary, Illinois 60013

Telephone: (847) 462-1937  
Fax No.: (847) 462-1937



PATENT  
APPEAL BRIEF

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Frederick Paul Benning et al. : Date: December 22, 2006  
Serial No.: 09/976,167 : Art Unit: 1765  
Confirmation No.: 1982 : Examiner: Shamim Ahmed  
Filed: October 12, 2001  
Title: SELF-CLEANING COLLOIDAL SLURRY  
COMPOSITION AND PROCESS FOR FINISHING  
A SURFACE OF A SUBSTRATE

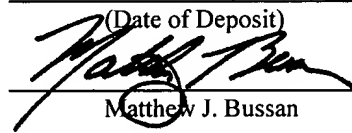
Commissioner for Patents  
P. O. Box 1450  
Alexandria VA 22313-1450

Dear Sir:

I hereby certify that this correspondence is  
being deposited with the United States Postal  
Service as first class mail in an envelope  
addressed to: Commissioner for Patents, P.O.  
Box 1450, Alexandria VA 22313-1450, on

December 22, 2006

(Date of Deposit)

  
Matthew J. Bussan

APPEAL BRIEF IN SUPPORT OF APPEAL  
FROM THE PRIMARY EXAMINER TO THE BOARD OF PATENT APPEALS

This Appeal Brief is filed pursuant to the Notice of Appeal filed this date.  
Appeal is made to the Board of Patent Appeals and Interferences from the decision dated  
October 17, 2006 of the primary examiner finally rejecting claims 41-50.

Docket No.: ROC920010111US1  
Serial No.: 09/976,167

Table of Contents

(i) Real party in interest .....	4
(ii) Related appeals and interferences .....	5
(iii) Status of claims .....	6
(iv) Status of Amendments .....	7
(v) Summary of claimed subject matter .....	8
(vi) Grounds of rejection to be reviewed on appeal .....	12
(vii) Argument .....	13
A. Issue: Whether claims 41-44 are unpatentable under 35 U.S.C. §103(a) over Hartog et al. (U.S. Patent No. 6,236,542) in view of Roberts (U.S. Patent No. 5,723,181)? .....	13
Independent claim 41 .....	14
Dependent claims 42-44 .....	17
B. Issue: Whether claims 45-50 are unpatentable under 35 U.S.C. §103(a) over Hartog et al. (U.S. Patent No. 6,236,542) in view of Kuroda et al. (U.S. Patent No. 6,268,979) and further in view of Burton et al. (U.S. Patent No. 6,083,838)? .....	18
Independent claims 45 and 50 (Claim 50 argued separately below) .....	19

PATENT  
APPEAL BRIEF

Independent claim 50 .....	22
Dependent claims 46-49 .....	23
C. Conclusion to argument .....	24
(viii) Claims appendix .....	25
(ix) Evidence appendix .....	29
(x) Related proceedings appendix .....	30

**(i) Real party in interest**

The real party in interest is International Business Machines Corporation; the inventors assigned their interest as recorded on October 12, 2001, on Reel 012256, Frame 0531.

**(ii) Related appeals and interferences**

There is an appeal filed this date in a copending application (Serial No. 11/008,806) that may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the instant appeal. There are no other known appeals, judicial proceedings or interferences that may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the instant appeal.

**(iii) Status of claims**

Claims 41-50 are rejected. Claims 1-40 are canceled.

Appeal is made to the Board of Patent Appeals and Interferences from the decision dated October 17, 2006 of the primary examiner finally rejecting claims 41-50. The claims on appeal are set forth in the Appendix I.

Claims 19-34 and 37-39 were canceled in the Response to Restriction Requirement filed on January 26, 2004. Claims 2 and 36 were canceled in the Amendment filed on April 11, 2005. Claims 1, 3-18, 35 and 40 were canceled in the Amendment filed on July 27, 2006. The Advisory Action dated December 6, 2006 echoed the canceled status of these claims. Consequently, claims 1-40 are not on appeal.



**(iv) Status of Amendments**

The only amendment filed subsequent to the final rejection was acted on by the examiner. The Amendment after Final, which was filed on November 20, 2006, was apparently entered for purposes of Appeal as no indication to the contrary was provided on the Advisory Action.

**(v) Summary of claimed subject matter**

As defined in each of the independent claims (i.e., claims 41, 45 and 50), the present invention is directed to a self-cleaning colloidal slurry composition for finishing a surface (i.e., “superfinishing” in claims 41 and 45, and “finishing” to provide a “textured surface” in claim 50) of a substrate for use in a data storage device. As defined in claim 41, the disk substrate is selected from a group consisting of a glass disk substrate, a ceramic disk substrate, and a glass-ceramic disk substrate. As defined in claims 45 and 50, the substrate is an aluminosilicate glass substrate. Also, as defined in each of these independent claims, the self-cleaning colloidal slurry comprises a carrying fluid, colloidal particles, etchant for etching the substrate, and a surfactant on (i.e., “precipitated onto” in claim 41, “adsorbed onto” in claim 45, and “adsorbed and/or precipitated onto” in claim 50) a surface of at least one of the substrate and the colloidal particles, the surfactant having a hydrophobic section that forms a steric hindrance barrier between the substrate and the colloidal particles. See, for example, the discussion at page 9, line 16 - page 10, line 10 of the specification.

The invention is best understood against the backdrop of understanding conventional superfinishing polish processes and slurries, and the problems associated therewith. See, for example, the discussion at page 4, lines 1-19 of the specification. In the conventional superfinishing polish process and slurry of the Hartog et al. patent (U.S. Patent No. 6,236,542), for example, colloidal silica particles attach to the surface being polished not only by the usual London dispersion forces, van der Waals forces and hydrogen bonding, but unlike NiP, also by molecular bonding. Standard methods of scrubbing with soaps using polyvinyl alcohol (PVA) pads, ultrasonics or megasonics will not remove any significant percentage of such molecular bonded silica particles. When used in conjunction with the superfinishing polish process and slurry of the Hartog et al.

patent, such conventional soap-based cleaning processes leave residual slurry material that must be removed from the surface of the disk substrates by a further cleaning mechanism (i.e., etching, micropolishing or polish etch). If these particles are left in place on the glass substrate, glide defects occur that can ultimately cause disk drive failure. These glide defects further cause magnetic defects, corrosion and decreased disk life. However, when used in conjunction with the self-cleaning colloidal slurry of the present invention, such conventional soap-based cleaning processes completely remove the remaining slurry material leaving the surface of the disk substrates free from contamination. See, for example, the discussion at page 17, lines 1-11 of the specification.

The existence of the steric hindrance barrier in the slurry composition goes to the heart of the present invention -- the steric hindrance barrier prevents the colloidal particles from ever bonding to the surface of disk substrate in the first place and permits removal of substantially all of the remaining contamination from the surface of the substrate using standard soap solutions. The steric hindrance barrier takes away molecular bonding, acid/base bonding, hydrogen bonding, and some or all of the van der Waals forces (amount depends on the surfactant composition and structure chosen) for the colloidal particles sticking to the surface of disk substrate. This allows conventional soap-based cleaning of disk substrates and removes the requirement for special and expensive extra cleaning steps, such as etching (undercutting) or micropolishing or polish etch, or combinations thereof. See, for example, the discussion at page 9, line 16 - page 10, line 10 and page 22, lines 6-17 of the specification.

Another aspect of the invention, as defined in independent claim 41, is that the surfactant is **“precipitated”**. In this regard, independent claim 41 requires specific

interaction between a surfactant and a substrate that is a glass disk substrate, a ceramic disk substrate, or a glass-ceramic disk substrate for use in a data storage device. The specific interaction claimed is that the surfactant is precipitated onto a surface of at least one of the substrate and the colloidal particles, and that the surfactant has a hydrophobic section that forms a steric hindrance barrier between the substrate and the colloidal particles. A combination of factors (e.g., surfactant type, the pH of the self-cleaning slurry composition, and the identity of the substrate and/or colloid) must be present for precipitation to occur. See, for example, the discussion of precipitating an anionic surfactant, such as sodium octyl sulfate (dependent claim 42), on the substrate and/or colloidal particle surfaces at page 22, line 24 - page 23, line 2 of the specification.

Still another aspect of the invention, as defined in each of independent claims 45 and 50, is that the surfactant is **an ethylene oxide propylene oxide block copolymer surfactant**. In this regard, independent claims 45 and 50 require specific interaction between the ethylene oxide propylene oxide block copolymer surfactant and an aluminosilicate glass substrate for use in a data storage device. The specific interaction claimed is that the ethylene oxide propylene oxide block copolymer surfactant is “adsorbed onto” (claim 45) or “adsorbed and/or precipitated onto” (claim 50) a surface of at least one of the aluminosilicate glass substrate and the colloidal silica particles, and that the ethylene oxide propylene oxide block copolymer surfactant has a hydrophobic section that forms a steric hindrance barrier between the aluminosilicate glass substrate and the colloidal silica particles. See, for example, the reference to ethylene oxide propylene oxide block copolymer at page 22, lines 18-23 and the discussion of the use of Corsheen CorAdd 9195 (which is described as an ethylene oxide propylene oxide block copolymer plus alkaloid component) at page 23, lines 19-23 of the specification. See, also Examples 1, 2, 3 and 4 of the specification -- each of these examples utilize the

above-mentioned Corsheen CorAdd 9195 ethylene oxide propylene oxide block copolymer.

In yet another aspect of the invention, as defined in independent claim 50, **the colloidal particles have a nominal size of approximately 70 - 200 nm to provide a textured surface on the disk substrate.** See, for example, the discussion at page 8, lines 11-15 of the specification. Texturing provides a circumferential texture pattern on the surface of the disk substrate that improves the magnetic characteristics of the magnetic data storage disk fabricated from the substrate. See, for example, the discussion of texturing at page 31, lines 7-13 of the specification.

**(vi) Grounds of rejection to be reviewed on appeal**

A. Whether claims 41-44 are unpatentable under 35 U.S.C. §103(a) over Hartog et al. (U.S. Patent No. 6,236,542) in view of Roberts (U.S. Patent No. 5,723,181)?

B. Whether claims 45-50 are unpatentable under 35 U.S.C. §103(a) over Hartog et al. (U.S. Patent No. 6,236,542) in view of Kuroda et al. (U.S. Patent No. 6,268,979) and further in view of Burton et al. (U.S. Patent No. 6,083,838)?

**(vii) Argument**

***A. Issue: Whether claims 41-44 are unpatentable under 35 U.S.C. §103(a) over Hartog et al. (U.S. Patent No. 6,236,542) in view of Roberts (U.S. Patent No. 5,723,181)?***

Claims 41-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartog et al. in view of Roberts.

The appellant respectfully submits that the Hartog et al. and Roberts references, alone and in combination, fail to disclose or suggest the invention as recited in claims 41-44 and requests reversal of the rejection under 35 U.S.C. 103(a).

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all of the claim limitations. See, MPEP § 2143. The appellant respectfully submits that these basic criteria are lacking in this rejection.

As discussed below, there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the primary reference to Hartog et al. or to combine the reference teachings as suggested by the Examiner. Moreover, as discussed below, there was no reasonable expectation of success in modifying the primary reference to Hartog et al. or combining

the reference teachings as suggested by the Examiner. The prior art references, fairly read, simply do not teach or suggest all of the claim limitations.

*Independent claim 41*

Independent claim 41 is directed to the “**precipitated**” surfactant embodiments of the present invention. In this regard, independent claim 41 requires specific interaction between a surfactant and a substrate that is a glass disk substrate, a ceramic disk substrate, or a glass-ceramic disk substrate for use in a data storage device. The specific interaction claimed is that the surfactant is precipitated onto a surface of at least one of the substrate and the colloidal particles, and that the surfactant has a hydrophobic section that forms a steric hindrance barrier between the substrate and the colloidal particles.

Neither the Hartog et al. reference nor the Roberts reference discloses or suggests that a surfactant is precipitated on a surface of a substrate and/or colloidal particles as required by independent claim 41. These references are, in fact, completely devoid of any mention of a precipitated surfactant.

A combination of factors (e.g., surfactant type, the pH of the self-cleaning slurry composition, and the identity of the substrate and/or colloid) must be present for precipitation to occur. See, for example, the discussion of precipitating an anionic surfactant on the substrate and/or colloidal surfaces at page 22, line 24 through page 23, line 2 of the present application. Such a combination of factors is proposed by the Examiner, but only through the application of forbidden hindsight in modifying the Hartog et al. reference to incorporate a particular surfactant taught in the Roberts reference.



The teaching or suggestion to make the claimed modification and the reasonable expectation of success must be found in the prior art, not applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). With regard to independent claim 41, the appellant respectfully submits that the teaching or suggestion to make the claimed modification and the reasonable expectation of success are based on impermissible hindsight gleaned from the appellant's disclosure, not the prior art. It is improper to use the inventor's patent application as an instruction book on how to reconstruct the prior art. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1 USPQ2d 1593 (Fed. Cir. 1987).

The Hartog et al. reference and the Roberts reference, alone and in combination, fail to teach the use of a surfactant to form a steric hindrance barrier between a substrate and colloidal particles. Although the Roberts reference teaches the addition of sodium octyl sulfate to its hydrophilizing composition as a preferred surfactant to speed up its hydrophilizing composition's function of rendering surfaces hydrophilic, the purpose of the addition of sodium octyl sulfate in the Roberts reference is inapplicable to the superpolishing process and slurry disclosed in the Hartog et al. reference. Robert's teaching of adding sodium octyl sulfate to its hydrophilizing composition to speed the formation of a hydrophilic surface on hydrophobic surfaces, such as synthetic fibers and wax, simply would not have lead one of ordinary skill in the art to add sodium octyl sulfate to Hartog's superpolishing slurry for polishing glass disk substrates (which already have a hydrophilic surface). The present invention seeks the opposite of what Robert's hydrophilizing composition is intended to accomplish. Robert's hydrophilizing composition is intended to form a hydrophilic surface on hydrophobic surfaces. The present invention seeks to change the disk substrate surface to a hydrophobic character. This is accomplished by providing a steric hindrance barrier -- a hydrophobic "tail"

section of a surfactant which has less affinity for the colloidal particles and/or disk substrate than it does for the carrying fluid of the slurry. See, for example, the discussion at page 22, lines 7-12 and page 24, lines 16-26 of the present application.

The Roberts reference is cited for its alleged teaching that “surfactant such as sodium octyl sulfate is used in a colloidal silica composition for changing the surface chemistry and resulted surface is more susceptible to the surface processing (col. 1, lines 49-60 and col. 2, lines 46-53).” See, Final Office Action, page 4, lines 16-18. However, the teaching of the Roberts reference regarding its surfactants is not as all-encompassing as the Examiner purports. Rather, the Roberts reference merely teaches that in some applications it may be desirable to add a surfactant (i.e., sodium octyl sulfate being listed as a preferred surfactant) to its hydrophilizing composition to speed the formation of a hydrophilic surface on a hydrophobic surface, such as that of wax or synthetic fibers. See, for example, Roberts, col. 2, lines 45-52. As noted in the Roberts reference, “[t]here is a need to render hydrophilic normally hydrophobic surfaces, for example, synthetic fibers such as polyethylene terephthalate, and apparels made therefrom, to wick water away from the body; hydrophobic synthetic films, such as polyester and polyolefin films, to permit wetting of the film and hydrophobic wax surfaces in investment casting uses to achieve adhesion of the mold binder composition to the wax pattern.” See, for example, Roberts, col. 1, lines 38-45.

It would not have been obvious to apply the teaching of the Roberts reference to the Hartog et al. reference as suggested by the Examiner for at least the three following reasons. First, the hydrophilizing composition disclosed in the Roberts reference (i.e., a hydrophilizing composition based on aqueous colloidal silica in combination with zirconyl salts) is different and performs a different function than the superpolishing slurry

disclosed in the Hartog et al. reference. Second, the Roberts reference teaches adding sodium octyl sulfate to its hydrophilizing composition for a purpose (i.e., speeding the hydrophilizing function of the hydrophilizing composition) that is inapplicable to the superpolishing slurry disclosed in the Hartog et al. reference. Third, the hydrophilizing composition disclosed in the Roberts reference operates on different surfaces (i.e., hydrophobic surfaces, such as synthetic fibers and wax) than the glass disk substrates (i.e., hydrophilic surfaces) operated on by the superpolishing slurry disclosed in the Hartog et al. reference.

In other words, the Roberts reference teaches adding the claimed surfactant to a different composition (i.e., a hydrophilizing composition), for a different reason (i.e., to speed the hydrophilizing function), and to operate on a different surface (i.e., hydrophobic surfaces, such as synthetic fibers and wax). Clearly, the three basic criteria to establish a *prima facie* case of obviousness (i.e., suggestion/motivation to modify the reference or to combine the reference teachings, reasonable expectation of success, and teaching/suggestion of all of the claim limitations) have not been met.

***Dependent claims 42-44***

Claims 42-44 depend, directly or indirectly, from independent claim 41. The appellant respectfully submits that the Hartog et al. and Roberts references cannot render unpatentable these dependent claims for at least the reasons discussed above with respect to independent claim 41.

***B. Issue: Whether claims 45-50 are unpatentable under 35 U.S.C. §103(a) over Hartog et al. (U.S. Patent No. 6,236,542) in view of Kuroda et al. (U.S. Patent No. 6,268,979) and further in view of Burton et al. (U.S. Patent No. 6,083,838)?***

Claims 45-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartog et al. in view of Kuroda and further in view of Burton et al.

The appellant respectfully submits that the Hartog et al., Kuroda and Burton et al. references, alone and in combination, fail to disclose or suggest the invention as recited in claims 45-50 and requests reversal of the rejection under 35 U.S.C. 103(a).

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all of the claim limitations. See, MPEP § 2143. The appellant respectfully submits that these basic criteria are lacking in this rejection.

As discussed below, there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the primary reference to Hartog et al. or to combine the reference teachings as suggested by the Examiner. Moreover, as discussed below, there was no reasonable expectation of success in modifying the primary reference to Hartog et al. or combining the reference teachings as suggested by the Examiner. The prior art references, fairly read, simply do not teach or suggest all of the claim limitations.

*Independent claims 45 and 50 (Claim 50 argued separately below)*

Independent claims 45 and 50 are each directed to the embodiments of the present invention **wherein the surfactant is an ethylene oxide propylene oxide block copolymer surfactant**. In this regard, independent claims 45 and 50 require specific interaction between the ethylene oxide propylene oxide block copolymer surfactant and an aluminosilicate glass substrate for use in a data storage device. The specific interaction claimed is that the ethylene oxide propylene oxide block copolymer surfactant is “adsorbed onto” (claim 45) or “adsorbed and/or precipitated onto” (claim 50) a surface of at least one of the aluminosilicate glass substrate and the colloidal silica particles, and that the ethylene oxide propylene oxide block copolymer surfactant has a hydrophobic section that forms a steric hindrance barrier between the aluminosilicate glass substrate and the colloidal silica particles.

The Hartog et al., Kuroda and Burton et al. references, alone and in combination, fail to teach the use of an ethylene oxide propylene oxide block copolymer surfactant to form a steric hindrance barrier between an aluminosilicate glass substrate and colloidal silica particles as required by each of independent claims 45 and 50.

Although the Burton et al. reference teaches the addition of propylene oxide ethylene oxide block copolymer surfactant to a metal CMP slurry to inhibit “oxide erosion” of metal stacks on a semiconductor wafer by reducing the rate of exposure of a metal (on the semiconductor wafer) to an oxidant (in the metal CMP slurry), the purpose of the addition of the propylene oxide ethylene oxide block copolymer surfactant in the Burton et al. reference is inapplicable to the superpolishing process and slurry disclosed in the Hartog et al. reference. See, for example, Burton et al., col. 2, lines 49-59 and col.

4, line 64 - col. 5, line 12. This teaching of the Burton et al. reference is inapplicable because the Hartog's superpolishing process and slurry is utilized for polishing disk substrate surfaces that have no metal stacks to be damaged or destroyed by oxide erosion.

The Burton et al. reference includes the following discussion about the problem of "oxide erosion", which occurs when semiconductor wafers are subjected to metal CMP.

During metal CMP, areas dense in features (i.e., alignment marks) tend to oxidize at a faster rate than areas with sparse distributions. This uncontrollable oxidation of the metals forming the alignment marks is commonly referred to as oxide erosion. Additionally, manufacturers have observed that oxide erosion in dense arrays increases dramatically as batch sizes are increased. In such instances, the alignment marks may be either completely destroyed or severely damaged by this erosion. Whether damaged or destroyed, the alignment marks are useless once altered by the erosion since they are no longer optically aligned parallel to the directions of the stage motion. (Burton et al., col. 1, line 62 - col. 2, line 6.)

The Burton et al. reference proposes to overcome the problem of oxide erosion by reducing the rate of exposure of the metal to the oxidant in various ways. Adding a surfactant to the CMP slurry is one of the ways the Burton et al. patent proposes to reduce the rate of exposure of the metal to the oxidant. See, for example, Burton et al., col. 2, lines 49-59 and col. 4, line 64 - col. 5, line 12. However, one of ordinary skill in the art would not have applied this teaching of Burton et al. reference to Hartog's superpolishing process and slurry which do not present the problem of oxide erosion, i.e., Hartog's superpolishing process and slurry are utilized for polishing disk substrate surfaces that have no metal stacks to be damaged or destroyed by oxide erosion.

In this regard, the rejection states the following.

Modified Hartog et al fail to teach the use of claimed surfactant such as an ethylene oxide propylene oxide block polymer.

However, Burton et al discloses a CMP slurry composition containing abrasive and surfactant is used to increase the polishing capability by increasing the viscosity of the slurry, wherein the surfactant is propylene oxide-ethylene oxide block copolymer (col.3, lines 62-65 and col.4, line 64-col.5, line 9).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to combine Burton et al's teaching into modified Hartog et al's teaching for increasing the polishing efficiency by introducing the improved surfactant as taught by Burton et al. (Final Office Action, page 5, line 18 - page 6, line 6.)

However, the Examiner is taking this teaching of the Burton et al. reference and applying it outside of the context of oxidation erosion, i.e., the problem that the Burton et al. reference purports to solve by adding a surfactant to a metal CMP. Burton's teaching, i.e., adding propylene oxide ethylene oxide block copolymer surfactant to a metal CMP slurry to inhibit oxide erosion of metal stacks on a semiconductor wafer, clearly would not lead one of ordinary skill in the art to add to ethylene oxide propylene oxide block copolymer surfactant to Hartog's superpolishing slurry for polishing disk substrate surfaces (which have no metal stacks to be damaged or destroyed by oxide erosion).

The teaching or suggestion to make the claimed modification and the reasonable expectation of success must be found in the prior art, not applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). With regard to independent claims 45 and 50, the appellant respectfully submits that the teaching or suggestion to make the claimed modification and the reasonable expectation of success are based on impermissible hindsight gleaned from the appellant's disclosure, not the prior art. It is improper to use the inventor's patent application as an instruction book on how to reconstruct the prior art. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1 USPQ2d 1593 (Fed. Cir. 1987).

*Independent claim 50*

Moreover, independent claim 50 additionally requires that **the colloidal particles have a specified nominal size of approximately 70 - 200 nm to provide a “textured surface”** on a disk substrate for use in a data storage device. Texturing is not taught in the Hartog et al. reference, the Kuroda reference, or the Burton et al. reference. Although the specified nominal size of the colloidal particles (i.e., 70-200 nm) set forth in claim 50 is within the definition of what constitutes a “colloidal particle” set forth in the Hartog et al. reference (i.e., 1-1000 nm), the Hartog et al. reference cannot reasonably be viewed as teaching the use of colloidal particles of all sizes falling within its broad definition and actually teaches away from using large colloidal particles. For example, at col. 6, line 32, the Hartog et al. patent states, “The smaller the particles the better.” At col. 6, lines 36-37, the Hartog et al. reference states, “For these reasons, soft colloidal particles of intermediate size were chosen for slurry 500.” Likewise, in each of the examples in the Hartog et al. reference, the colloidal particles are smaller than the specified nominal size of the colloidal particles (i.e., 70-200 nm) set forth in claim 50.

It is important to note that the teachings of the Hartog et al. reference are in the context of superfinishing -- not texturing. This is the reason that the Hartog et al. reference limits the colloidal particles in its slurry to an intermediate size. Texturing, which is mentioned nowhere in the Hartog et al., Kuroda, or Burton et al. references, requires larger colloidal particles. Texturing in the context of finishing disk substrates is important because it provides a circumferential texture pattern on the surface of the disk substrate that improves the magnetic characteristics of the magnetic data storage disk fabricated from the substrate. See, for example, the discussion at page 31, lines 7-13 of the present application.



A reasonable view of the teachings of the Hartog et al. patent would lead one of ordinary skill in the art to polish a disk substrate surface to “near atomic smoothness” through the use of colloidal particles smaller than the specified nominal size of the colloidal particles (i.e., 70-200 nm) set forth in claim 50 and hence no textured surface would be provided. Texturing, which is mentioned nowhere in the Hartog et al., Kuroda, or Burton et al. references, requires larger colloidal particles than those reasonably taught by the Hartog et al. reference.


***Dependent claims 46-49***

Claims 46-49 depend, directly, from independent claim 45. The appellant respectfully submits that the Hartog et al., Kuroda and Burton et al. references cannot render unpatentable these dependent claims for at least the reasons discussed above with respect to independent claim 45.

*C. Conclusion to argument*

In view of the above arguments, the appellant respectfully submits that claims 41-50 are patentable over the cited art references, and the rejections thereof under 35 U.S.C. 103(a) should be reversed.

Respectfully submitted,

By: 

Matthew J. Bussan  
Registration No.: 33,614  
1048 Dove Way  
Cary, Illinois 60013

Telephone: (847) 462-1937  
Fax No.: (847) 462-1937

**(viii) Claims appendix**

1           41. A self-cleaning colloidal slurry composition for superfinishing a surface of a  
2 substrate, the self-cleaning colloidal slurry composition comprising:  
3           a carrying fluid;  
4           colloidal particles;  
5           etchant for etching the substrate;  
6           a surfactant precipitated onto a surface of at least one of the substrate and the  
7 colloidal particles, the surfactant having a hydrophobic section that forms a steric  
8 hindrance barrier between the substrate and the colloidal particles,  
9           wherein the substrate is selected from a group consisting of a glass disk substrate, a  
10 ceramic disk substrate, and a glass-ceramic disk substrate for use in a data storage device.

1           42. The self-cleaning colloidal slurry composition as recited in claim 41, wherein  
2 the surfactant is sodium octyl sulfate.

1           43. The self-cleaning colloidal slurry composition as recited in claim 42, wherein  
2 the self-cleaning colloidal slurry composition has a pH that is approximately equal to or  
3 less than the isoelectric point of the surface onto which the surfactant is precipitated.

1           44. The self-cleaning colloidal slurry composition as recited in claim 42, wherein  
2           the self-cleaning colloidal slurry composition has a pH that is approximately  $\leq 7$ .

1           45. A self-cleaning colloidal slurry composition for superfinishing a surface of an  
2           aluminosilicate glass substrate for use in a data storage device, the self-cleaning colloidal  
3           slurry composition comprising:

4           a carrying fluid;  
5           colloidal silica particles having a nominal size of approximately 2 - 200 nm;  
6           etchant for etching the aluminosilicate glass substrate, wherein the etchant is a  
7           metal etchant selected from a group consisting of  $\text{Ce}^{+4}$  and  $\text{Fe}^{+3}$  ions, and combinations  
8           thereof, and wherein the metal etchant is present in solution and/or as a colloid and/or on  
9           the colloidal silica particles;

10          an ethylene oxide propylene oxide block copolymer surfactant adsorbed onto a  
11          surface of at least one of the aluminosilicate glass substrate and the colloidal silica  
12          particles, the ethylene oxide propylene oxide block copolymer surfactant having a  
13          hydrophobic section that forms a steric hindrance barrier between the aluminosilicate  
14          glass substrate and the colloidal silica particles;

15          and wherein the self-cleaning colloidal slurry composition has a pH of  
16          approximately 0 to 4.

PATENT  
APPEAL BRIEF

1           46. The self-cleaning colloidal slurry composition as recited in claim 45, wherein  
2           the self-cleaning colloidal slurry composition has a pH of approximately 0.8 to 3.0.

1           47. The self-cleaning colloidal slurry composition as recited in claim 45, wherein  
2           the self-cleaning colloidal slurry composition has a pH of approximately 1.0 to 2.0.

1           48. The self-cleaning colloidal slurry composition as recited in claim 45, wherein  
2           the colloidal silica particles include colloidal silica spheres having a nominal size of  
3           approximately 7 nm.

1           49. The self-cleaning colloidal slurry composition as recited in claim 45, wherein  
2           the metal etchant is  $\text{Ce}^{+4}$  ions.

1           50. A self-cleaning colloidal slurry composition for finishing a surface of an  
2           aluminosilicate glass substrate for use in a data storage device, the self-cleaning colloidal  
3           slurry composition comprising:  
4           a carrying fluid;  
5           colloidal silica particles;  
6           etchant for etching the aluminosilicate glass substrate, wherein the etchant is a  
7           metal etchant selected from a group consisting of  $Ce^{+4}$  and  $Fe^{+3}$  ions, and combinations  
8           thereof, and wherein the metal etchant is present in solution and/or as a colloid and/or on  
9           the colloidal silica particles;  
10          an ethylene oxide propylene oxide block copolymer surfactant adsorbed and/or  
11          precipitated onto a surface of at least one of the aluminosilicate glass substrate and the  
12          colloidal silica particles, the ethylene oxide propylene oxide block copolymer surfactant  
13          having a hydrophobic section that forms a steric hindrance barrier between the  
14          aluminosilicate glass substrate and the colloidal silica particles,  
15          wherein the self-cleaning colloidal slurry composition has a pH of approximately 0  
16          to 4, and  
17          and wherein the colloidal silica particles have a nominal size of approximately  
18          70 - 200 nm to provide a textured surface on the aluminosilicate glass substrate.

**(ix) Evidence appendix**

NONE.

**(x) Related proceedings appendix**

NONE. (No decision rendered.)